

I. IN THE CLAIMS

These claims will replace all prior versions of claims in the present application.

1. (Currently amended) An information processing system comprising:

(a) a plurality of memory modules, each module having a memory and a control device; and

(b) data transmission paths for connecting the memory modules and transmitting a value from one of the memory modules to other memory modules,

in which each of the memory modules retains a value list of values of a first item, or a value list of values of a second item to be unified, or the value list of values of the first item and the value list of values of the second item, the values being ranked in an ascending or descending order without duplication, characterized in that

the control device of each of the memory modules comprises

i. a data sending means for sending the values included in the value list of the first item, or the value list of the second item or the value list of the first item and the value list of the second item to the other memory modules;

ii. a data receiving means for receiving the values included in the value list of the first item, or the value list of second item, of the value list of the first item and the value list of the second item from the other memory modules; and

iii. a unifying means for referring to the value list of the first item and the value list of the second item in the other memory modules received by the data receiving means and deciding a ranking of the values in the value list of the first item, or the values in the value list of the second item, or the values in the value list of the first item and the second

item, in view of the values included in the value lists of the first and the second items from all of the other memory modules,

the unifying means comprising

a first ranking decision means for referring to the value list of the first item in each of the memory modules or the value list of the second item in each of the memory modules, or the value list of the first item and the value list of the second item, in each of the memory modules as well as the value lists of the first and the second items in the other memory modules received by the data receiving means,

for comparing the values of the value list of the second item in each of the memory modules, the values of the value ~~lists~~list of the first item in the other memory module, or the values of the value ~~lists~~list of the second item in the other memory modules with the values of the value list of the first item of each of the memory modules, and if any of the values in the compared value lists is equal to the values of the value list of the first item in each of the memory modules, deleting the identical value, and

for deciding a global value ranking for the first item in view of the values included in the value lists of the first item and the second item in each of the memory modules and in the value lists of the first item and the second item in the other memory modules and storing the decided ranking in a first global order storage array for storing the global value ranking at a position corresponding to a value of each of the memory modules; and

a second ranking decision means for referring to the value list of the first item in each of the memory modules, or the value list of the second item in each of the memory modules, or the value list of the first item and the value

list of the second item in each of the memory modules, as well as the value lists of the first and the second items in the other memory modules received by the data receiving means,

for comparing the values of the value list of the first item in each of the memory modules, the values of the value ~~lists~~list of the first item in the other memory modules, or the values of the value ~~lists~~list of the second item in the other memory modules with the values of the value list of the second item in each of the memory modules, and if any of the values in the compared value lists is equal to the values of the value list of the second item in each of the memory modules, deleting said any of the values, and

for deciding a global value ranking for the second item in view of the values included in the value lists of the first item and the second item in each of the memory modules and in the value lists of the first item and the second item in the other memory modules and storing the decided ranking in a second global order storage array for storing the global value ranking at the position corresponding to the value of each of the memory modules.

2. (Canceled)

3. (Previously presented) The information processing system according to claim 1, wherein the value list of the first item from which the identical value is deleted is sent to the other memory modules via the data transmission path or to the second ranking decision means by the data sending means and

the value list of the second item from which the identical value is deleted is sent to the other memory modules via the data transmission path or to the first ranking decision means by the data sending means.

4. (Currently amended) The information processing system according to claim 23, wherein

the control device of each of the memory modules further comprises:

a first occurrence count array generation means for generating a first occurrence count array storing occurrence counts of the values in the value list of the second item in all the memory modules; and

a second occurrence count array generation means for generating, based on the occurrence counts in the first occurrence count array relating to the value list of the second item, a second occurrence count array storing occurrence counts of the values of the value list of the first item, the occurrence counts in the second occurrence count array corresponding to the occurrence counts in the first occurrence count array.

5. (Previously presented) The information processing system according to claim 4, wherein

the first occurrence count array generation means generates a local occurrence count array storing the occurrence counts of the value list of the second item in each of the memory modules;

the data sending means sends combinations of the occurrence counts in the local occurrence count array and the corresponding values in the second global value number array; and

the first occurrence count array generation means is arranged to refer to the occurrence counts of the local occurrence count array and the values of the second global value number array in the other memory modules received by the data receiving means and to

generate the first occurrence count array in view of the occurrence counts in the local occurrence count array in the other memory modules.

6. (Previously presented) The information processing system according to claim 4, wherein

the data sending means sends combinations of the occurrence counts in the first occurrence count array and the values in the first global order storage array to the other memory modules; and

the second occurrence count array generation means is arranged to generate a region for a counter array and a cumulative number array having a size identical to the value list and used as the second occurrence count array in the storage,

the second occurrence count array generation means is arranged to refer to the occurrence counts in the first occurrence count array in the other memory modules received by the data receiving means, and is arranged to increase a value at a corresponding position in the counter array by a certain value when any of the values in the order storage array in the other memory modules is equal to the value in the first global order storage array in each of the memory modules, said certain value being said any of the values in the order storage array in the other memory modules and also increase a value at a next storage position number in the cumulative number array by said any of the values in the order storage array in the other memory modules, or increase a value in the cumulative number array at a storage position number next to the position corresponding to the value in the order storage array in the other memory modules by the value in the order storage array in the other memory modules when none of the values in the order storage array in the other memory modules is equal to the values in the first global order storage array in each of the memory modules, and

the second occurrence count array generation means is arranged to generate a final cumulative number array by accumulating the values of the cumulative number array in the order of the storage position numbers.

7. (Previously presented) The information processing system according to claim 4, wherein

the data sending means sends combinations of the occurrence counts of the first occurrence count array and the values of the first global order storage array to the other memory modules; and

the second occurrence count array generation means is arranged to generate a region for a counter array and a cumulative number array having a size identical to the value list and used as the second occurrence count array in the storage,

the second occurrence count array generation means is arranged to refer to the occurrence counts of the first occurrence count array in the other memory modules received by the data receiving means, and is arranged to increase a value at a corresponding position in the counter array by a certain value when any of the values in the order storage array in the other memory modules is equal to the value in the first global order storage array in each of the memory modules, said certain value being said any one of values in the order storage array in the other memory modules, and also increase a value at a next storage position number in the cumulative number array by said any of the values in the order storage array in the other memory modules, or increase the value at the corresponding position in the counter array by "1", when none of the values in the order storage array in the other memory modules is equal to the values in the first global order storage array in each of the memory modules, store an invalid value as the value, at the position corresponding to the value in the order storage array in the other memory modules, in the cumulative number array, and increase the

value of the storage position number next to the corresponding position by the value of the order storage array in the other memory modules, and

the second occurrence count array generation means is arranged to accumulate the values of the cumulative number array in the order of the storage position numbers.

8. (Previously presented) The information processing system according to claim 4, further comprising a data readout means for reading out the values in the value list of the first item based on the occurrence counts in the second occurrence count array so duplication of identical values is allowed.

9. (Previously presented) The information processing system according to claim 6, further comprising:

a data readout means for reading out the values in the value list of the first item based on the occurrence counts of the second occurrence count array so duplication of identical values is allowed, wherein

the data readout means is arranged to generate a second cumulative number array indicating a total number of records having the values of the order storage array not exceeding the value of the order storage array of each of the memory modules by referring to the combinations of the values of the order storage array and corresponding values of the count array of the other memory modules and read out the values in the value list of the first item based on the values of the second cumulative number array, the value of the count array corresponding to the storage position of the second cumulative number, and the value of the final cumulative number array corresponding to the storage position so duplication of identical values is allowed.

10 - 13. (Cancelled)

14. (Currently amended) A method for unifying a value list in an information processing system, wherein the system comprises

a plurality of memory modules, each module having a memory and a control device;
and

data transmission paths for connecting the memory modules and transmitting a value from one of the memory modules to other memory modules, wherein

each of the memory modules retains a value first list of values of a first item, or a value list of values of a second item to be unified, or the value list of values of the first item and the value list of values of the second item, the values being ranked in an ascending or descending order without duplication,

wherein the method comprises, in the control device of each of the memory modules:

(a) a data sending step for sending the values included in value lists list of the first item, or the value list of the second item or the value list of the first item and the value list of the second item to the other memory modules;

(b) a data receiving step for receiving the values included in value lists list of the first item, or the value list of the second item or the value list of the first item and the value list of the second item from the other memory modules; and

(c) a unifying step for referring to the value list of the first item and the value list of the second item of the other memory modules received in the data receiving step, and for deciding a ranking of the values in the value list of the first item, or the values in the value list of the second item, or the values in the value list of the first item and the value list of the second item, in view of the values included in the value lists of the first and the second items from all of the other memory modules;

the unifying step comprising

i. a first ranking decision step

(i-1) for referring to the value list of the first item in each of the memory modules, or the value list of the second item in each of the memory modules, or the value list of the first item and the value list of the second item in each of the memory modules, as well as the value lists of the first and the second items in the other memory modules received in the data receiving step;

(i-2) for comparing the values of the value list of the second item in each of the memory modules, the values of the value lists-list of the first item in the other memory modules, or the values of the value lists-list of the second item in the other memory modules with the values of the value list of the first item in each of the memory modules and, if any of the values in the compared value list is equal to the values of the value list of the first item in each of the memory modules, deleting said any of the values; and

(i-3) for deciding a global value ranking for the first item in view of the values included in the value lists of the first item and the second item in each of the memory modules and in the value lists of the first item and the second item in the other memory modules and storing the decided ranking in a first global order storage array for storing the global value ranking at a position corresponding to a value of each of the memory modules; and

ii. a second ranking decision step

(ii-1) for referring to the value list of the first item in each of the memory modules, or the value list of the second item in each of the memory modules, or the value list of the first item and the value list of the second item

in each of the memory modules, as well as the value lists of the first and the second items in the other memory modules received in the data receiving step;

(ii-2) for comparing the values of the value list of the first item in each of the memory modules, the values of the value ~~lists~~list of the first item in the other memory modules, or the values of the value ~~lists~~list of the second item in the other memory modules with the values of the value list of the second item in each of the memory modules and, if any of the values in the compared value list is equal to the values of the value list of the second item in each of the memory modules deleting the identical value; and

(ii-3) for deciding a global value ranking for the second item in view of the values included in the value lists of the first item and the second item in each of the memory modules and the other memory modules and storing the decided ranking in a second global order storage array for storing the global value ranking at the position corresponding to the value of each of the memory modules.

15. (Canceled)

16. (Previously presented) The method according to claim 14, wherein

the value list of the first item from which the identical value is deleted is sent to the other memory modules via the data transmission path or becomes an object to be processed in the second ranking decision step, and

the value list of the second item from which the identical value is deleted is sent to the other memory modules via the data transmission path or becomes an object to be processed in the first ranking decision step.

17. (Previously presented) The method according to claim 16, wherein in the control device of each of the memory modules, the method further comprises:

a first occurrence count array generation step for generating a first occurrence count array storing occurrence counts of the values of the value list of the second item in all the other memory modules; and

a second occurrence count array generation step for generating a second occurrence count array storing occurrence counts of the values in the value list of the first item corresponding to the occurrence counts in the first occurrence count array based on the occurrence counts in the first occurrence count array relating to the value list of the second item in all the other memory modules.

18. (Previously presented) The method according to claim 17, wherein

the first occurrence count array generation step comprises a step for generating a local occurrence count array storing the occurrence counts of the value list of the second item in each of the memory modules;

the data sending step comprises a step for sending combinations of the occurrence counts in the local occurrence count array and the values in the second global value number array corresponding to the local occurrence count array to the other memory modules; and

the first occurrence count array generation step comprises a step for referring to the occurrence counts in the local occurrence count array and the values of the second global value number array in the other memory module received in the data receiving step and for generating the first occurrence count array in view of the occurrence counts in the local occurrence count array in the other memory modules.

19. (Previously presented) The method according to claim 17, wherein

the data sending step comprises a step for sending combinations of the occurrence counts in the first occurrence count array and the values of the first global order storage array to the other memory modules; and

the second occurrence count array generation step comprises
a step for generating a region for a counter array and a cumulative number array having a size identical to the value list and used as the second occurrence count array in the storage; and

a step for referring to the occurrence counts in the first occurrence count array from the other memory module received in the data receiving step, for increasing a value at a corresponding position in the counter array by a certain value when any of the values in the order storage array in the other memory modules is equal to the value in the first global order storage array in each of the memory modules, said certain value being said any of the values in the order storage array in the other memory modules and also increasing a value at a next storage position number in the cumulative number array by said any of the values in the order storage array in the other memory modules, or increasing a value in the cumulative number array at a storage position number next to the position corresponding to the value in the order storage array in the other memory modules by the value in the order storage array in the other memory modules when none of the values in the order storage array in the other memory modules is equal to the values in the first global order storage array in each of the memory modules, and

for generating a final cumulative number array by accumulating the values of the cumulative number array in the order of the storage position numbers.

20. (Previously presented) The method according to claim 17, wherein

the data sending step comprises a step for sending combinations of the occurrence counts of the first occurrence count array and the first global order storage array to the other memory modules; and

the second occurrence count array generation step comprises

a step for generating a region for a counter array and a cumulative number array having a size identical to the value list and used as the second occurrence count array in the storage; and

a step for referring to the occurrence counts in the first occurrence count array from the other memory module received in the data receiving step, for increasing a value at a corresponding position in the counter array by a certain value when any of the values in the order storage array in the other memory modules is equal to the value in the first global order storage array in each of the memory modules, said certain value being said any one of values in the order storage array in the other memory modules, and also increasing a value at a next storage position number in the cumulative number array by said any of the values in the order storage array in the other memory modules, or increasing the value at the corresponding position in the counter array by "1", when none of the values in the order storage array in the other memory modules is equal to the values in the first global order storage array in each of the memory modules, storing an invalid value as the value, at the position corresponding to the value in the order storage array in the other memory modules, in the cumulative number array, and increasing the value of the storage position number next to the corresponding position by the value of the order storage array in the other memory modules and

for generating a final cumulative number array by accumulating the values of the cumulative number array in the order of the storage position numbers.

21. (Previously presented) The method according to claim 17, further comprising:

a data readout step for reading out the values in the value list of the first item based on the occurrence counts in the second occurrence count array so that duplication of identical values is allowed.

22. (Previously presented) The method according to claim 19, further comprising:

a data readout step for reading out the values in the value list of the first item based on the occurrence counts in the second occurrence count array so that duplication of identical values is allowed, wherein

the data readout step comprises

a step for generating a second cumulative number array indicating a total number of records having the values of the order storage array not exceeding the values of the order storage array of each of the memory modules by referring to the combinations of the values of the order storage array and corresponding values of the count array of the other memory modules; and

a step for reading out the values in the value list of the first item based on the values of the second cumulative number array, the value of the count array corresponding to the storage position of the second cumulative number, and the value of the final cumulative number array corresponding to the storage position so that duplication of identical values is allowed.

23 - 26. (Cancelled)